INVERTEBRATE BIODIVERSITY CONSERVATION EDUCATION: EXPERIENCE WITH A BENDIGO PRIMARY SCHOOL

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Targeting primary school children for invertebrate conservation education could be an effective strategy for promoting conservation of invertebrate biodiversity because both children and parents become informed. In 1993, at Bendigo, a class of primary school children aged 9 to 10 years studied invertebrates in a small sanctuary of Box Ironbark woodland on the school site. Educational objectives included increasing the children's knowledge of the inhabitants of the reserve and, through the experience, learning to appreciate the wonder and value of the nature reserve. Weekly field-based lessons focused on the diversity of invertebrate species, especially those that lived under rocks and on two local species of trees. The children participated in the lessons, particularly the field classes, with enthusiasm. They also carried out their observations with purpose. Their new appreciation for common plant species and their new interest in the bush and its miniature world were demonstrated in their oral and written work. The major difficulty we encountered was the lack of field guides for local invertebrates. For education, this lack off suitable literature needs to be rectified urgently. The development of regional booklets is an important area of community education that deserves funding support. □*Environmental education, school, invertebrate, survey, biodiversity, conservation, Victoria, Australia.*

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An essential strategy in the conservation of Australia's invertebrate diversity is effective community education. It is urgent that the importance of invertebrates and their diversity become more widely appreciated by the total community to ensure strategies are enacted to maximise the survival of Australia's invertebrates.

Primary schools are useful focuses for community education. Children are naturally inquisitive, they have good visual abilities, they enjoy working outdoors and they pass on information to their parents. Also, there is potential for whole community education through school newsletters.

The strategy of targeting primary school children for community education programs is not new. Examples include the Gould League in Victoria, which produces conservation education materials (including posters and guides, e.g. Miller, 1983), much of which are appropriate for primary school children; Saltwatch Programs in Victoria, which involve school children in monitoring salinity (Anon., 1993); and the CSIRO, which has involved children through the Double Helix Science Club in a national earthworm survey (Anon., 1992). However, conservation of invertebrates does not usually have a high profile in nature conservation studies in our schools and much more could be done.

This paper reports an experience of invertebrate biodiversity education in a primary school based on field work in a school sanctuary.

METHODS

During Semester 1, 1993, JMS, a biologist, worked with SH, a primary school teacher, and her class of children aged from 9 to 11 years, students of Spring Gully Primary School, Bendigo, Victoria.

The school has a small reserve within the school grounds known as *The Sanctuary*, which has been set aside in the school plan. It consists of a small area (less than one hectare) of regenerated Box Ironbark woodland situated on top of a ridge with outcrops of hard sandstone. The area has a high structural and species diversity and low weed invasion. It features many small rocks which provide shelter for ground dwelling invertebrates. The school's Sanctuary

is becoming increasingly isolated both by encroaching suburban development and by the continued development of the school grounds as the number of enrolments at the school grow.

The lessons on invertebrates had the following educational objectives:

Cognitive

Children developed their skills in the following areas:

- methods of looking for invertebrates in the Spring Gully Primary School Sanctuary,
- methods of handling invertebrates safely (both for the children and the animals),
- book research for invertebrate identification, life cycle and ecological information,
- discrimination in telling the animals apart and naming them,
- classification by sorting into species and higher order groupings,
- oral reporting by sharing their findings with the rest of the class,
- written reporting by listing animals found, sizes, numbers and where found and
- group skills by working in small groups of two or three.

Affective

The children developed their interest in invertebrates by their discovery of many different kinds in the Sanctuary and that common plants house many different species.

The children learnt about conservation of invertebrates and conservation of the Sanctuary by

- carrying out observation in situ as much as possible,
- replacing disturbed rocks and logs to exactly the same place and
- returning collected animals as soon as possible to the exact spot from where they were collected.

The program consisted of weekly sessions of approximately one hour when JMS was present, reinforced by use of the Sanctuary as a theme for some of the other class work during the week (SH). Apart from the introductory session and occasional wet weather, all the sessions were based in the field.

The first two field sessions were used for discovery and were restricted to in situ observations and observations under rocks. A sample beating of *Cassinia arcuata* (known in the Bendigo district as Chinese Scrub, but listed by Cleary & Leamon [1988] as Drooping Cassinia) and a search of a litter sample was also performed.

The lessons then focused on invertebrates occurring on *C. arcuata* and *Acacia pycnantha* (Golden Wattle) and a number of particular invertebrate species chosen by the children. *C. arcuata* and *A. pycnantha* are both common pioneer shrubs in the Bendigo area. *C. arcuata* is regarded as a weed by many residents and, until recently, was on the noxious weeds list for some areas of Victoria.

Children collected from particular plants of the preceding two species by beating. They took the collection into the classroom for listing, measurement and counting and returned the collection to the plant at the end of the session. Where the animals could not be identified, the children gave each species a name. The information was recorded on prepared data sheets.

The children used a number of guides for identification of the animals collected: Child (1965), Clyne (1969), Main (1964) and Mascord (1970) for spiders; and Goode (1980) and Healy & Smithers (1971) for insects. CSIRO (1991) was consulted by the teachers.

RESULTS AND DISCUSSION

Conservation Education

The children became enthusiastic about invertebrates early in the project. They readily learnt whatever information was available for the species they were observing.

Field-based sessions were more widely appreciated than classroom sessions. The children were learning to think about the miniature world and the place of the different species in the food chain.

The children observed that many species of invertebrates live on a single plant of *C. arcuata* or *A. pycnantha*, and realized the importance of the plant as a habitat for animals. Most species found on *C. arcuata* were the same as those found on *A. pycnantha*. It was impossible to be sure whether there was a significant difference in inhabitants between the two plant species because of problems with identification (see below). Table 1 gives an incomplete comparative list of insects and spiders derived from two trappings a month apart. Only species identified at least to family level were included.

In all, the children appreciated the diversity of invertebrates that live in the patch of bush at their school.

General Education

The children used their discrimination skills effectively. They readily recognized animals

TABLE 1. Invertebrates occurring on *Cassinia arcuata* and *Acacia pycnantha*. Species were included in the table only if they were identified at least to family.

		Cassinia arcuata	*Acacia pycnantha*
Araneae			
Araneidae			
brown and green spiderlings		yes	yes
turret spider	*Dolophones turrigera*	no	yes
Thomisidae			
green flower spider	*Hedana valida*	yes	yes
white, large abdomen		yes	no
Oxyopidae			
choc chip spider	*Oxyopes* sp.	yes	yes
Clubionidae			
cappuccino choc chip spider	*Cheiracanthium* sp.	yes	yes
Salticidae			
jumping spider		yes	yes
Insecta			
Collembola			
spring tail		yes	yes
Hemerobiidae			
brown lacewing larva		yes	yes
Cicadidae			
green grocer cicada	*Cyclochila australasiae*	no	yes
Eurymelidae			
fluorescent green leaf hopper		yes	no
Pentatomidae			
green vegetable bug		yes	no
brown horned bug with central dorsal white spot	*Omyta centrolineata*	yes	no
Psyllidae			
psyllid		no	yes
Flatidae			
green leafhopper with green opaque wings	*Siphanta acuta*	yes	no
Blattidae			
little black cockroach nymph with white dorsal spots		yes	no
Geometridae			
looper caterpillar		yes	no

that they had seen before, even though many of them were only a few millimetres in length.

Children of diverse abilities found success. Children in each group could share the tasks required according to their individual skills if necessary.

Males and females participated equally and sex roles were broken down. Early in the program, some boys would show off by handling the hairy caterpillars, while some of the girls would hang back; later, both boys and girls were equally keen to handle the animals and all seemed to respect them more.

The children's increased appreciation for invertebrates and the Sanctuary was demonstrated in their written work, particularly in poems, posters and articles which were written for the class newsletter. Figure 1 is a poster drawn in colour by two of the children when asked to express what they liked most about their school. It expresses a reluctance to leave the Sanctuary and its scorpions and birds when the teacher says that it is time to return to the classroom.

One of the poems concludes this paper. It demonstrates both an appreciation of biodiversity and a sense of wonder of life in the Sanctuary. One of the children, Nathan Smith, largely on his own initiative, carried out a survey of attitudes of other teachers on the staff to *C. arcuata*. In his small sample of six, he found that three considered it to be a weed and would remove any plants of this species from their backyard; one was not sure; and two thought it was important and would retain it in their backyard.

Problems

There were several problems. Difficulties were experienced in identifying the animals. Insufficient information on terrestrial invertebrates is available at a level that can be used by community members or children (see also Czechura, 1994). The problem was exacerbated by our policy of putting the invertebrates back at the end of each lesson.

FIG. 1. This poster was made by Robert Steele and Geoffrey Mattheson in response to a request to say what they liked most about their school. The original was in colour and A3 size.

Because we had no reference collection and few illustrations of the species encountered, we could not be confident that all the children were calling the same species by the same name. Because the children worked in small groups, not all the people in the group, including the adults, saw the specimens together with the children's names before the animals were returned to the Sanctuary. In some cases, different forms of the same species might have been listed under different names by the children, e.g. the green flower spider (*Hedana valida)* on the same day was referred to as 'spearmint' by one group and 'green fluoro spider' by another group.

We were concerned that frequent use of the Sanctuary would adversely impact on organisms in the reserve, particularly small plants such as orchids and litter animals. We also suspected that some of the animals were not re-establishing themselves after they were returned to the reserve because later collections included some dead specimens.

There was evidence that the knowledge of how to find invertebrates had spread to other children in the school, but the knowledge of how to conserve them did not. Rocks in the Sanctuary were disturbed by other children but were not replaced with the result that some of the animals being monitored could not be found again.

We were also concerned about the safety of the children with poisonous species.

CONCLUSIONS

Our experience indicates that the program was beneficial to the children involved. Future extensions of the program are being investigated.

Our experience also indicates that it is impossible to carry out a study of this kind without making at least a small reference collection of identified specimens that can be used for comparisons. A major drawback to invertebrate biodiversity community education is that insufficient resources are available to allow ready identification of many common species by community members. The most useful books — Clyne (1969), Healy & Smithers (1971) and Mascord (1970) — had clear, coloured

photographs, which could be readily recognized by the children. However, an insufficient number of the species found in the Sanctuary were illustrated in these books.

For education about invertebrates, the lack off suitable literature needs to be rectified urgently. The development of regional booklets, such as are currently available for plants (e.g. Cleary & Leamon, 1988), is an important area of community education that deserves funding support.

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LOOK

Ants, spiders, everywhere
Crawling up legs and
Preying for food.
LOOK at that!
There's a scorpion
With its several
Babies on its back.
Isn't the Sanctuary a wonderful place
When you come to think of it?

RHIANNON CAHILL